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16. Abstract (Limit: 200 words)

This is a technical analyses of the 1988 Physicians' Practice Cost and Income Survey (1988 PPCIS). It examines the effects of allowing substitutes (proxies) to respond to the practice costs, revenue, or payer mix questions. The intended physician respondent may not be able to answer certain financial questions easily or accurately because accounting functions may have been delegated to an office manager, secretary, bookkeeper, or an accountant. In such cases, item non-response may be minimized if a proxy is used. This study examines who uses proxies, completeness of proxy responses, and whether there are differences in data reported. Surgical specialties, board certified, older, busier, and women physicians were more likely to use proxies. The size of a practice, acceptance of Medicaid, and high expenses were also correlated with proxy use. Proxy respondents have non-response rates similar to physician respondents. Controlling for other practice and physician characteristics, the authors found that proxies report significantly higher expense data for most cost items. It is impossible to determine based on information available to the investigators, whether proxy respondents or physicians provide more accurate information. Proxies may offer a number of benefits such as higher response rates on certain items and conversion of some refusal cases into a respondent. However, users are cautioned that there are systematic and significant differences in the absolute values of certain cost data reported by proxies on the 1988 PPCIS. Nine text tables and four appendix tables are included.

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ANALYSIS OF PROXY EFFECTS IN THE 1988 PHYSICIANS' PRACTICE COSTS AND INCOME SURVEY

Final Report

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ANALYSIS OF PROXY EFFECTS IN THE 1988 PHYSICIANS' PRACTICE COSTS AND INCOME SURVEY

1.0 INTRODUCTION

Surveys of physicians--especially those asking about physician practice costs, revenues, and payor mix--may encounter the problem of physicians not being able to answer easily or accurately because they have delegated accounting tasks to a secretary, bookkeeper, or accountant. In addition, the time price of physicians can often be quite high, hence the opportunity cost of participating in a survey may be prohibitively high. In such cases, item nonresponse can perhaps be minimized by providing physicians the option to designate a proxy to respond to one or more sections of a survey. However, the value of proxy respondents depends entirely on their ability and willingness to respond on behalf of a physician.

We have identified two studies of proxy effects on physician survey data. Marder and Thran (1988), using the American Medical Association's (AMA) Socioeconomic Monitoring System, found that physicians with higher wage rates were more likely to designate a proxy and that physicians designating proxies differed significantly by specialty, region, and professional activity from those that did not use proxies. They also found that item nonresponse was significantly higher for cases using a proxy.

Using the 1988 Physicians' Practice Costs and Income Survey (PPCIS), Brown (1991) found that proxies reported total practice expenses that were only 60 percent of total expenses reported by physician respondents. However, this study used an earlier version of the Public Use Tape that included a miscoding of the proxy indicator. In addition, annual wages for physician employees were counted twice in the calculation of physician practice expenses, the dependent variable in the analysis.

The results of these studies raise questions about the impact of proxies on item response rates and completeness of data. Should physician surveys rely on proxies to minimize the level of physician effort? Or could the use of proxies be detrimental to data quality? This paper examines proxy effects using three separate approaches. First, descriptive and multivariate analyses identify who uses proxies. Second, item nonresponse rates for proxy and nonproxy cases are compared to determine whether cases with proxies are more (or less) complete. Finally, we examine differences in the data reported by nonproxy cases versus proxy cases, again using both descriptive and multivariate analyses.

2.0 DATA SOURCE

This analysis is based on the 1988 Physicians' Practice Costs and Income Survey (PPCIS). The 1988 PPCIS is a national, stratified random sample of U.S. physicians, drawn from the Physician Masterfile maintained by the AMA. To be eligible for the survey, physicians had to provide patient care services for at least 20 hours per week and either be a full or part owner of their practice or employed by a physician or group of physicians. Those employed by a hospital, HMO clinic, or similar arrangement are excluded. For a more detailed description of the survey, see Thalji et al., (1991).

The final number of completed cases was 3,505, achieving an overall response rate of 61 percent. Of the total sample screened, 36 percent, or 3,015 physicians were ineligible to participate and were thus excluded from the survey. Most of these physicians were ineligible because of their employment arrangement.

The survey was divided into the following sections: employment, productivity, practice size, practice costs, practice revenues, net income, malpractice, Medicare, demographics, and medical equipment (Thalji et al., 1991). Only the practice costs, malpractice, Medicare, and medical equipment sections were permitted to be answered by someone other than the physician.

At the end of the survey, the interviewer recorded whether a physician or a proxy completed the cost section of the questionnaire. If a proxy responded, the interviewer noted whether the individual was a bookkeeper, office manager, accountant, receptionist, billing office, or other. The 1988 PPCIS Public Use File contains a dichotomous indicator (called PROXY) which is equal to 1 if any type of proxy responded to the cost section and equal to zero if the physician responded to the cost section.*

Because physician employees were skipped from the cost section, they were excluded from this analysis, resulting in a sample of 3,086 physicians who were full or part owners of their main practice. Of these physicians, 1,254 (42.7 percent) designated a proxy to respond to the cost section, while 1,683 (54.5 percent) did not. The remaining 149 cases (2.8 percent) were missing the proxy indicator and are excluded from this analysis.

3.0 WHO USES A PROXY?

3.1 Hypotheses

What are the characteristics of physicians designating a proxy to answer the cost section? One basic hypothesis is that "busier" physicians may be more likely to designate a proxy so that they can reduce their time input into the interview. Another hypothesis is that physicians with a higher opportunity cost (higher hourly wage rate) may find it prohibitively expensive to spend time participating in the entire interview, and thus would be more likely to designate a proxy. Finally, another basic hypothesis is that physicians in larger practices may be more likely to delegate to proxies; such practices are more likely to employ full or part-time bookkeepers and accountants. Other practice characteristics, such as board certification, specialty, and urbanicity may capture differences in the style of practice.

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*It should be noted that the PROXY variable on the Public Use File is incorrect, because missing data are included with PROXY=1. The correct indicator can be constructed based on INT69B: If INT69B>1 then PROXY=1; else if INT69B=1 then PROXY=0.

3.2 Descriptive Results

Tables 1 through 4 compare the use of proxies across personal, geographic, and practice characteristics. Chi-square statistics were calculated for each set of strata to test for the statistical significance of differences.

Physicians' specialty was a significant factor in the choice of whether to use a proxy (Table 1). Surgical specialties (taken together) used proxies more frequently than general/family practitioners (GP/FP) and medical specialists; however there was wide fluctuation within surgical subspecialties. Orthopedic surgeons, obstetricians and gynecologists (OB/GYN), and thoracic surgeons were more likely to designate a proxy than other surgical specialties. Psychiatrists, anesthesiologists, and "other" specialists (principally pathologists and emergency physicians) were least likely to use proxies, probably reflecting the lower level of practice overhead expenses associated with these specialties.

There was little variation in the use of proxies according to the age and gender of the physician. Physicians that graduated from foreign medical schools (FMGs) were significantly less likely to designate a proxy. Board certified physicians used proxies significantly more often than those that were not board certified. Assuming board certification is a crude measure of quality, a higher quality physician may be busier and thus more apt to designate a proxy.

The use of proxies varied significantly by several practice characteristics (Table 2). The size of the practice, determined by the total number of full-time equivalent physicians (both full or part owners <u>and</u> physician employees), was a highly significant stratifying variable. Only 32 percent of solo practitioners designated a proxy, compared with 74 percent of practices with over 10 physicians. The mean practice size for physicians designating a proxy was 7.3, compared to 2.9 for physicians not designating a proxy (Table 3). Larger practices are more likely to be multispecialty practices; therefore, proxy use also varied significantly by whether a practice was multispecialty.

TABLE 1

DEMOGRAPHIC CHARACTERISTICS OF PHYSICIANS DESIGNATING A PROXY VERSUS THOSE NOT DESIGNATING A PROXY

	MDs DESIGNATING A PROXY		MDs NOT DESIGNATING A PROXY	
Characteristic	n	%	n	%
Total	**1,254**	**42.7%**	**1,683**	**57.3%**
Specialty (X^2=129.7, p=0.0*)				
GP/FP	162	44.0	206	56.0
Internal Medicine	154	47.7	169	52.3
Cardiology	66	53.7	57	46.3
Gastroenterology	53	41.1	76	58.9
Other Medical	91	39.1	142	60.9
General Surgery	93	47.5	103	52.6
Orthopedic Surgery	68	55.3	55	44.7
Ophthalmology	50	36.2	88	63.8
Urology	63	38.2	102	61.8
OB/GYN	129	55.6	103	44.4
Cardiovascular Thoracic Surgery	75	58.6	53	41.4
Other Surgery	78	47.3	87	52.7
Psychiatry	40	20.4	156	79.6
Anesthesiology	36	21.3	133	78.7
Radiology	54	42.5	73	57.5
Other Specialties	42	34.4	80	65.6
Age (X^2=5.0, p=0.4)				
<35	103	41.0	148	59.0
35-39	227	41.0	327	59.0
40-49	439	43.0	583	57.0
50-59	315	45.7	374	54.3
60-64	103	41.9	143	58.1
65+	67	38.3	108	61.7
Gender (X^2=1.0, p=0.3)				
Male	1,178	43.0	1,565	57.0
Female	76	39.2	118	60.8
Graduate of Foreign Medical School (X^2=9.6, p=0.0*)				
No	1,013	44.2	1,279	55.8
Yes	241	37.4	404	62.6
Board Certified (X^2=11.6, p=0.0*)				
No	262	37.2	443	62.8
Yes	992	44.4	1,240	55.6

*Chi-Square is significant at 0.05 or better, indicating significant differences between proxy and nonproxy cases within strata.

Note: Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

TABLE 2

PRACTICE CHARACTERISTICS OF PHYSICIANS DESIGNATING A PROXY VERSUS THOSE NOT DESIGNATING A PROXY

	MDs DESIGNATING A PROXY		MDs NOT DESIGNATING A PROXY	
Characteristic	n	%	n	%
Total	**1,254**	**42.7%**	**1,683**	**57.3%**
Practice Size (X^2=214.5, p=0.0*)				
Solo	509	32.0	1,084	68.0
2	161	46.0	189	54.0
3-4	223	51.7	208	48.3
5-10	186	57.1	140	42.9
>10	174	74.4	60	25.6
Multi-Specialty Group (X^2=77.1, p=0.0*)				
No	1,017	39.6	1,549	60.4
Yes	236	63.8	134	36.2
Accepts Medicaid Patients (X^2=12.6, p=0.0*)				
No	167	35.3	306	64.7
Yes	1,086	44.1	1,376	55.9
Medicare Caseload (X^2=15.4, p=0.0*)				
None	62	30.2	143	69.8
1-20%	335	42.4	455	57.6
20-40%	422	44.4	528	55.6
40+%	394	44.6	490	55.4
Total Per MD Practice Expenses (X^2=104.2, p=0.0*)				
<$250,000	403	32.7	830	67.3
$250,000-350,000	345	44.5	430	55.5
$350,000+	506	54.5	423	45.5

*Chi-Square is significant at 0.05 or better, indicating significant differences between proxy and nonproxy cases within strata.

Note: Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

TABLE 3

COMPARISONS OF MEANS FOR SELECTED PHYSICIAN PRACTICE CHARACTERISTICS, PROXY VERSUS NONPROXY CASES

	MDs DESIGNATING A PROXY			MDs NOT DESIGNATING A PROXY			
Characteristic	N	Mean	Standard Deviation	N	Mean	Standard Deviation	t-value
Practice Size	1,253	7.3	18.1	1,681	2.9	8.7	7.80***
Percent Medicare Patients	1,213	34.2%	22.6%	1,616	31.9%	22.1%	2.73***
Medical Hours/Week	1,254	54.4	16.5	1,683	51.4	14.7	5.15***
Annual Medical Hours	1,251	2,607.3	807.5	1,670	2,467.8	725.3	4.82***
Total Visits/Week	1,085	121.2	63.5	1,388	109.8	63.1	4.43***

Note: Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

Whether a practice accepts Medicaid or Medicare patients was also associated with use of a proxy. For example, 44 percent of physicians with Medicaid patients versus 35 percent with no Medicaid patients designated a proxy, perhaps reflecting a more complex billing and accounting system. Similarly, physicians that did not treat Medicare patients were less likely to use a proxy. The mean percent of revenues from Medicare patients was 34 percent for physicians designating a proxy versus 32 percent for physicians not designating a proxy (Table 3).

Consistent with the hypotheses stated earlier, physicians designating a proxy were significantly "busier" than others. Physicians designating a proxy worked more medical hours per week, had more total visits per week, and worked more total annual medical hours than physicians not designating a proxy (Table 3). All of these differences were highly significant. In addition, the decision to designate a proxy varied significantly according to per-physician practice expenses. Physicians with lower per-physician expenses were less likely to designate a proxy than higher-expense physicians. As practice expenses increase, so may the complexity of the accounting systems, thus necessitating input from a proxy. Section 4.3 investigates this through cost function estimation.

Finally, the likelihood of using a proxy varied significantly by Census Division and urbanicity (Table 4). Physicians in the Middle Atlantic and Pacific states (34-38 percent) were least inclined to designate proxy respondents relative to those in the West North Central States (56 percent). There was little variation within the remaining divisions. Surprisingly, physicians in large urban areas were <u>less</u> likely to use a proxy than those in small urban or rural areas. Since a large share of urban areas are situated in the Middle Atlantic and Pacific states, it is likely that a large part of the variation by Census Division is explained by variation by urbanicity.

3.3 Multivariate Results

In order to assess the independent contribution of each characteristic in the decision to use a proxy, holding all other variables constant, logistic regression was performed. Logistic regression is preferred for analysis where a binary or dichotomous "outcome" measure is used

TABLE 4

GEOGRAPHIC LOCATION OF PHYSICIANS DESIGNATING A PROXY VERSUS THOSE NOT DESIGNATING A PROXY

	MDs DESIGNATING A PROXY		MDs NOT DESIGNATING A PROXY	
Characteristic	n	%	n	%
Total	**1,254**	**42.7%**	**1,683**	**57.3%**
Division (X^2=38.6, p=0.0*)				
New England	69	41.1	99	58.9
Middle Atlantic	144	33.7	283	66.3
East North Central	195	45.4	235	54.7
West North Central	120	56.1	94	43.9
South Atlantic	228	42.6	307	57.4
East South Central	87	46.8	99	53.2
West South Central	138	45.3	167	54.8
Mountain	81	47.4	90	52.6
Pacific	192	38.3	309	61.7
Urbanicity (X^2=47.0, p=0.0*)				
Rural	345	47.5	382	52.5
Small Urban	628	46.3	729	53.7
Large Urban	281	32.9	572	67.1

*Chi-Square is significant at 0.05 or better, indicating significant differences between proxy and nonproxy cases within strata.

Note: Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

as the dependent variable (Hosmer and Lemeshow, 1989). The regression estimates the relative contribution of each independent variable in determining the probability of using a proxy. The basic structure of the logistic model is based on several of the hypotheses stated above. In summary, we would expect physicians' use of proxies to depend on (1) time availability, (2) opportunity cost of time, and (3) a vector of characteristics, such as practice size, specialty, board certification, and location. The model is written:

$$p(PROXY) = f(VISITS, WAGES, X)$$

where p(PROXY) is the probability that a physician will designate a proxy and X is a vector of physician and practice characteristics. The other variables are measures of workload and opportunity cost.

The results of the logistic regression are shown on Table 5. In general, the results were consistent with the descriptive findings and supported the a priori hypotheses. The "log likelihood" of the model, which is a measure of the overall fit of the model, was significant at the .01 level, implying that a significant amount of variation in the dependent variable is explained by variation in the independent variables. Additionally, based on predicted values the model correctly classifies 62.3 percent of the observations.

The results support the hypothesis that "busier" physicians are more likely to designate a proxy; the more office visits per week and the more surgical operations per week, the more likely physicians were to designate a proxy. The hypothesis that physicians with a higher opportunity cost of time are more apt to designate a proxy was also supported.

Several practice characteristic variables were also significant. Practice size was the most dramatic. The larger the practice, the more likely physicians were to designate proxies (the omitted group was solo practitioners in general practice in New England). All four size variables were significant at the .01 level or better. An additional size measure, number of administrative and clerical staff, was included to measure differences in accounting infastructure. Its sign was significantly positive, implying that the "supply" of proxies (i.e., accountants and clerical staff) is a determinant of their use. The standardized parameter estimates are largest for the size variables, indicating that relative to the other independent variables, size contributes the most to the model's predictive ability.

TABLE 5

FACTORS ASSOCIATED WITH USE OF PROXY RESPONDENTS (MAXIMUM LIKELIHOOD ESTIMATES FROM LOGISTIC REGRESSION)

Variable	Parameter Estimate	Standardized Parameter Estimate	Wald Chi-Square
Workload			
Nonsurgical Visits per Week	0.0006	0.0196	0.58
Surgical Procedures per Week	0.0029	0.0163	0.41
Opportunity costs			
Physician's Hourly Wage ($)	0.0023	0.0659	6.08**
Geographic Location			
Rural County	0.1432	0.0344	1.67
Large Urban County	-0.3291	-0.0819	8.37***
(Small Urban is Ommitted)			
Middle Atlantic Division	-0.0152	-0.0029	0.01
East North Central Division	0.1967	0.0382	0.87
West North Central Division	0.2937	0.0422	1.49
South Atlantic Division	0.0996	0.0216	0.24
East South Central Division	0.1375	0.0190	0.32
West South Central Division	0.2913	0.0490	1.73
Mountain Division	0.2725	0.0345	1.14
Pacific Division	0.1310	0.0266	0.39
(New England Division is Omitted)			
Demographic and Practice Characteristics			
Physician's Age (Years)	0.0094	0.0529	4.51**
Graduate of Foreign Medical School	0.0544	0.0124	0.24
Physician's Gender (Female = 1)	0.3573	0.0459	3.66**
Multi-Specialty Group	-0.3208	-0.0584	3.39*
Board Certified	0.0119	0.0028	0.01
# of Administrative & Clerical Staff	0.0137	0.1588	7.43***
Group Size (number of FTE MDs)			
2	0.4530	0.0857	12.03***
3 to 4	0.7570	0.1487	32.50***
5 to 10	1.1659	0.1909	44.02***
> 10	1.3813	0.1787	17.45***
(Solo is Omitted)			
Specialty			
Medical Specialties	0.0054	0.0014	0.00
Surgical Specialties	0.0444	0.0122	0.10
Other Specialties	-0.1957	-0.0285	0.90
(GP/FP is Omitted)			
Intercept	-1.3807	--	14.72***
Number of Observations = 2,394			
Log Likelihood = 225.07***			
Percent Correctly Classified = 62.3%			

*Significant at .10 or better.
**Significant at .05 or better.
***Significant at .01 or better.

Note: Reference group is General and Family Practitioners in solo practice in New England. Data excludes physcian employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

Several other variables were important in the model. Surprisingly, physicians practicing in large urban areas were less likely to designate a proxy than those in smaller urban areas, ceteris paribus. Older physicians were more likely to use a proxy, holding other factors constant. Women were also more likely to designate a proxy. Physicians in "other" specialties, which include psychiatrists, anesthesiologists, radiologists, pathologists, and other (mostly hospital-based) specialties were less likely to designate a proxy, consistent with the descriptive results.

4.0 PROXY EFFECTS ON REPORTED DATA

There are two concerns regarding the use of proxies. The first is whether the use of proxies results in differential rates of item response. The second concern is the accuracy of proxy-reported data. Although it is very difficult to determine the accuracy of responses, it is possible to compare responses, testing for statistically significant differences. This section addresses the first concern by analyzing item response rates between proxy and nonproxy cases. The second concern is addressed through both descriptive and multivariate analyses of differences in reported data.

4.1 Proxy Effects on Item Response

The goal of allowing proxies to respond to certain parts of the questionnaire was to minimize item nonresponse rates in those sections requiring practice information that may not be easily available to some physicians. Although we cannot directly test whether physicians would have otherwise responded "don't know" or some other type of nonresponse had a proxy not been used, it is possible that the decreased time burden placed on the physician may contribute to higher response rates elsewhere in the survey. Here we measure whether cases involving proxies have similar nonresponse rates as nonproxy cases.

Proxy respondents have nonresponse rates very similar to those of physician respondents (Table 6). Nonresponse is calculated as the sum of all non-numeric responses (excluding valid skips) divided by the "total possible numeric responses." (See Appendix A for detailed nonresponse tables.) Nonresponse rate differences between the two groups did not

TABLE 6

COMPARISONS OF NONRESPONSE[a] BETWEEN PROXY AND NONPROXY CASES: EXPENSE QUESTIONS

Question Number	Description	ITEM NONRESPONSE RATES: Proxy Cases	Nonproxy Cases	Percentage Point Difference
Q16	Total Physician Wages	6.9%	6.2%	0.7%
Q16A	Total Physician Deferred Comp.	27.3	24.5	2.8
Q16B	Total Physician Fringe Benefits	21.6	24.1	-2.6
Q17	Physician Employee Wages	5.4	3.5	1.8
Q17A	Physician Employee Deferred Comp.	8.8	4.8	4.0
Q17B	Physician Employee Fringe Benefits	8.5	5.6	2.9
Q18	Nonphysician Employee Wages	4.5	5.2	-0.7
Q18A	Nonphysician Employee Deferred Comp.	18.6	18.8	-0.2
Q18B	Nonphysician Employee Benefits	16.7	18.1	-1.4
Q19A	Office Rental/Lease	0.5	1.2	-0.7
Q19B	Office Depreciation/Interest	3.8	3.5	0.3
Q19D	Utilities	2.3	4.9	-2.6
Q21	Medical Equipment	11.3	13.0	-1.7
Q22	Medical Materials & Supplies	4.9	7.9	-3.0
Q23	Malpractice (all members)	2.4	1.9	0.5
Q24	Automobile	6.3	7.5	-1.2
Q25	Continuing Education	4.5	4.6	-0.1
Q26	Miscellaneous	5.0	6.1	-1.1

[a]Nonresponse is defined as the total number of numeric responses divided by the total number of possible numeric responses. Refer to Appendix A for more detailed tables.

Note: Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

exceed ±3 percent in most cases. The largest differences were questions 17A and 17B, where respondents were asked to report deferred compensation and fringe benefits for physician employees. For both variables, proxies had considerably higher levels of item nonresponse. However, proxies had lower nonresponse rates for physician fringe benefits, office utilities, and medical materials and supplies.

Another measure of item nonresponse on the cost questions, which we call the aggregate nonresponse rate, is defined as the total number of actual numeric responses divided by the total number of possible numeric responses for each group. The rate was extremely similar for the two groups--9.0 percent for nonproxy cases and 8.8 percent for proxy cases (data not shown).

In addition to comparing nonresponse for the cost questions, we extended the analysis of nonresponse to all questions that were allowed to be answered by a proxy. The additional sections were malpractice and Medicare. We assume that if a proxy was used in the cost section (as indicated by the PROXY variable) then a proxy would likely have been used in the malpractice and Medicare sections as well.

As shown in Table 7, proxy respondents were less familiar with certain aspects of a physician's malpractice coverage than the physician respondents. In particular, for physicians with no malpractice coverage, proxies were less likely to know whether the doctor was covered through the hospital or the year coverage was discontinued. In fact, Question 34A (year of malpractice insurance discontinuation) had the most disparity--nonproxy cases had a nonresponse rate of 6.3 percent while proxy cases had a nonresponse rate of 25.0 percent; however, only a small number of cases were asked this question (n=29). Proxy respondents were more familiar with the practice's Medicare patients; proxies had lower nonresponse rates for the entire Medicare section. Questions 41A through 42, which ask about Medicare billing practices, are examples of questions where proxy cases were slightly more knowledgable than physicians. The aggregate nonresponse rate was 6.3 percent for nonproxy cases and 5.7 percent for proxy cases (data not shown).

TABLE 7

COMPARISONS OF NONRESPONSE[a] BETWEEN PROXY AND NONPROXY CASES: MALPRACTICE AND MEDICARE QUESTIONS[b]

Question Number	Description	ITEM NONRESPONSE RATES: Proxy Cases	Nonproxy Cases	Percentage Point Difference
Malpractice				
Q31	Physician's own Malpractice Premiums	2.2%	1.2%	1.0%
Q32	Payment to State Comp. Fund	42.2	31.5	10.7
Q33	Hospital Paid Premium (yes/no)	1.4	1.1	0.3
Q33	Hospital's Share of Premium	0.7	2.6	-0.9
Q34	Hospital or Self-Insured	66.0	55.6	10.4
Q34A	Year Malpractice Discontinued	25.0	6.3	18.7
Q35	Limit per Case	3.3	2.6	0.7
Q36	Total Limit	3.7	2.9	0.8
Q37	Umbrella Policy yes/no	4.8	3.0	1.8
Q37A	Umbrella Policy limit	22.1	14.6	7.5
Medicare				
Q38A	Percent Revenues, Uninsured	5.3	5.4	-0.1
Q38B	Percent Revenues, Medicare	3.3	4.0	-0.7
Q38C	Percent Revenues, Medicaid	4.5	4.8	-0.3
Q38D	Percent Revenues, Blue Shield	14.4	16.3	-1.9
Q38E	Percent Revenues, Other priv.	8.1	10.7	-2.6
Q38F	Percent Revenues, Other	4.9	5.7	-0.8
Q38G	Percent Medicare/Supplemental	11.6	13.1	-1.5
Q38H	Percent Medicare/Medicaid	9.2	10.1	-0.9
Q39	Signed par. agreement April 1988	0.4	0.7	-0.3
Q40	Signed par. agreement January 1989	0.4	0.8	-0.4
Q40B	Percent Assigned Patients	4.5	5.4	-0.9
Q40C	Percent Charge Collected, non-assign.	8.8	10.6	-1.8
Q41A	Percent Cases, Bill Insurer	2.6	5.5	-2.9
Q41B	Percent Cases, Bill Patient	2.8	5.7	-1.9
Q41C	Percent Cases, Bill for Deductions	3.2	5.5	-2.3
Q41D	Percent Cases, Bill for Copay	3.4	6.7	-3.3
Q42	Percent Copay Collected	7.1	10.7	-3.6

[a]Nonresponse is defined as the total number of numeric responses divided by the total number of possible numeric responses. Refer to Appendix A for more detailed tables.

[b]Proxies were allowed to respond to the expense, malpractice, Medicare, and equipment/lab sections, however, the PROXY variable only indicates whether a proxy responded to the expense section.

Note: Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

4.2 Differences in Nonproxy Versus Proxy Responses

An important question is whether proxy respondents report significantly different data than physician respondents. One hypothesis is that physicians may intentionally overstate practice costs in order to not jeopardize their current government reimbursement, while proxies would report figures as they appear on tax documents. However, physicians may understate wages paid to themselves or other physicians. Since wages are the largest share of total practice expenses, such an effect may negate over-reporting at other questions. An additional hypothesis is that proxies are likely to report higher expenses because of greater familiarity with the smaller (though possibly numerous) expenses that are likely to not gain the attention of the physician. Finally, it is possible that proxies report lower expenses because they are not as knowledgeable as the physician; however the physician simply may not have had time to respond and designated a proxy instead.

Proxies report significantly higher expense data for most of the cost section questions (Table 8). In particular, miscellaneous expenses reported by proxies are 56 percent ($8,750) higher than the values reported by physicians. It is likely that proxies are more cognizant of the smaller, "daily" expenses, which may explain proxies' higher responses. Total practice expenses per MD were 31 percent ($90,000) higher for physicians designating a proxy; overhead expenses per MD were 49 percent ($60,000) higher for physicians designating a proxy. The only instance where proxies reported lower amounts was automobile expenses (Q24).

4.3 Cost Function Estimation

To determine whether the differences in reported costs were attributable to the use of proxies or to some other factor, we estimated a standard cost function, including the PROXY variable as an independent variable. Given our initial hypotheses and the results from the previous section, the variable PROXY would be expected to have a positive coefficient.

TABLE 8

COMPARISONS OF MEANS FOR PRACTICE EXPENSE QUESTIONS, PROXY VERSUS NONPROXY REPORTED CASES[a]

		MDs DESIGNATING A PROXY			MDs NOT DESIGNATING A PROXY			
Question Number	Description[b]	N	Mean	Standard Deviation	N	Mean	Standard Deviation	t-value
Q16	Total Physician Wages	1,166	$171,336	$200,296	1,578	$146,327	$152,354	3.57***
Q16A	Total Physician Deferred Comp.	911	22,707	60,534	1,270	14,355	32,235	3.80***
Q16B	Total Physician Fringe Bene.	982	12,565	22,342	1,276	8,890	15,400	4.41***
Q17	Physician Employee Wages	1,184	7,130	24,280	1,620	4,020	22,668	3.44***
Q17A	Physician Employee Deferred Comp.	1,142	506	4,878	1,598	323	6,157	0.87
Q17B	Physician Employee Fringe Bene.	1,146	642	3,210	1,588	210	1,347	4.29***
Q18	Nonphysician Employee Wages	1,197	59,172	125,167	1,594	42,651	61,036	4.21***
Q18A	Nonphysician Employee Comp.	1,020	3,260	12,372	1,366	2,678	5,903	1.39
Q18B	Nonphysician Employee Bene.	1,044	8,331	20,396	1,378	4,614	8,221	5.56***
Q19A	Office Rental/lease	1,236	17,367	46,448	1,647	14,147	21,821	2.26**
Q19B	Office Depreciation	1,195	2,231	9,477	1,608	1,664	6,306	1.79*
Q19D	Utilities	1,224	5,517	9,070	1,597	4,741	20,469	1.35
Q21	Medical Equipment	1,111	7,138	27,829	1,464	6,620	29,523	0.46
Q22	Medical Materials & Supplies	1,192	20,953	139,054	1,549	11,851	22,886	2.24**
Q23	Malpractice; all members	1,223	18,014	22,875	1,650	15,509	14,708	3.35***
Q24	Automobile	1,174	2,174	3,541	1,556	2,566	3,399	-2.91***
Q25	Continuing Education	1,197	2,894	5,401	1,65	2,874	3,821	0.11
Q26	Miscellaneous	1,190	24,268	36,972	1,580	15,514	27,578	6.86***
TOTCST	Total Practice Expense	875	379,487	591,127	902	289,669	249,478	4.21***
OVHCST	Total Overhead Practice Expenses	878	183,389	383,870	1,025	123,409	105,270	4.14***

*Significant at .10 or better.
**Sifnificant at .05 or better.
***Significant at .01 or better.

[a]Proxies were allowed to respond to the expense, malpractice, Medicare, and equipment/lab sections; however, the PROXY variable only indicates whether a proxy responded to the expense section.

[b]All figures are calculated on a per-physician basis.

Note: Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

The cost function specification used in this analysis is of the general form:

$$COST = f(OUTPUT, INPUT\ PRICES, X)$$

where output is measured by nonsurgery visits per week and surgical operations per week; input prices are measured by hourly wages of physicians and aides as well as a measure of area practice costs (the Geographic Practice Costs Index); and X is a vector of physician/practice characteristics. (For a comprehensive review of cost function literature, refer to Pope and Burge, 1992.)

A total of four measures of practice expenses were included as dependent variables. Total practice expenses (Equation 1) were calculated by adding together all of the individual cost components. If a component was missing, total cost was set to missing. However, if missing values indicated that a variable was combined with another, the case was not excluded. A measure of overhead practice expenses was constructed in a similar manner; however, physicians' own wages were excluded (Equation 2). Two additional dependent variables were created using the same methods except with imputed expense data. (For a description of imputation methodology, see Dayhoff, et al., 1992.)

To capture economies of scale in physician practice, a squared and a cubed office visit term were included; as the number of visits per week increase, costs are expected to increase at a slower rate. As visits continue to increase, costs would begin to rise at a faster rate as the marginal cost of treating an additional patient exceeds the average cost.

Three measures of input prices are included. First, physician hourly wage, defined as physician net income divided by total annual hours worked, is included as a price for physicians' time.* Aide wage was also included as an input price. Although there is a high degree of correlation between aide wage and total cost, aide wages on average only account for 17 percent of total practice costs (Dayhoff and Cromwell, 1991). Finally, the Geographic Practice Costs Index (GPCI) is included to measure differences in practice costs between Metropolitan Statistical Areas (MSAs and rural areas within a state) (Welch, et al., 1989). The coefficients for these input price variables are expected to be positive.

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*The potential endogeneity of physician wages is reduced by using net income rather than total wages.

A vector of physician and practice characteristics includes age (and age squared), practice size, specialty, a multispecialty group indicator, a board certification indicator, a variable indicating whether the practice employs physicians, and a variable indicating whether a proxy responded to the cost section. Some basic hypotheses apply to the characteristics variables:

- As physicians get older, their practices may become larger (more patients) and more productive (more services), and thus have higher costs. However, it is likely that the physician will reach a point in time where they will begin to decrease their work effort. Therefore, the relationship between age and total per-physician expenses is best captured by both a continuous age variable plus a squared age term, the coefficients of which are expected to be positive and negative, respectively.

- Practice size (the number of full-time equivalent physicians) is expected to have a negative effect on costs per physician. As practices get larger, physicians have more ability to share resources and capture economies of scale in the provision of services. The expectation is that larger practices will have lower per-physician total practice expenses. Multispecialty practices, which are often large practices, are likely to have similar effects.

- Specialty captures many of the small "style" of practice differences that are otherwise difficult to measure. Surgical specialists are likely to use more resources and have higher wages than general practitioners and medical specialists, therefore they are expected to have a positive effect on total costs. Board certification status also measures style differences; a board certified physician may offer a higher "quality" (and possibly higher priced) service. Whether a practice employs physicians may also measure style differences.

- It is difficult to predict the sign on the proxy variable. On one hand, it is likely that proxies will have access to information regarding the smaller expense items such as equipment, supplies, automobile, continuing education, and miscellaneous expenses. On the other hand, proxies may be less able to accurately report the larger expenses, such as malpractice and wages. It is difficult to determine a priori which of these effects, if any, will be stronger--holding other characteristics constant. However, based purely on the descriptive results reported above, the proxy variable is expected to have a positive coefficient.

The results of the least squares regressions are shown on Table 9. Physician hourly wage and aide wage were highly significant factors affecting total and overhead practice expenses per physician (both imputed and nonimputed). The higher the average hourly

TABLE 9

COST FUNCTION PARAMETER ESTIMATES FROM LEAST SQUARES REGRESSION; DEPENDENT VARIABLE = IMPUTED AND NON-IMPUTED TOTAL AND OVERHEAD PRACTICE EXPENSES

	TOTAL PRACTICE EXPENSES NONIMPUTED (Eq. 1)		TOTAL OVERHEAD PRACTICE EXPENSES, NONIMPUTED (Eq. 2)		TOTAL PRACTICE EXPENSES, IMPUTED (Eq. 3)		TOTAL OVERHEAD PRACTICE EXPENSES, IMPUTED (Eq. 4)	
Variable	Parameter Estimate	T-Statistic (Ho:b=0)	Parameter Estimate	T-Statistic (Ho:b=0)	Parameter Estimate	T-Statistic (Ho:b=0)	Parameter Estimate	T-Statistic (Ho:b=0)
Intercept	-$147,520.7	-0.89	-$107,045.6	-1.05	-$87,330.6	-0.86	-$58,919.9	-0.92
Nonsurgical Visits/Week	-869.8	-1.10	-318.3	-0.65	-443.3	-0.92	-203.2	-0.66
NonSurgical Visits/Week, Squared	7.9	1.58	4.4	1.44	5.7	1.84**	3.5	1.76*
NonSurgical Visits/Week, Cubed	-0.01	-1.50	-0.01	-1.46	-0.01	-1.70*	-0.01	-1.76*
Surgical Procedures/Week	1,016.3	1.23	359.0	0.70	881.8	1.70*	210.3	0.64
Physician's Hourly Wage Rate ($)	1,389.3	8.82***	236.4	2.12**	1,449.9	14.61***	200.2	3.18***
Aide's Hourly Wage Rate ($)	21,513.2	40.63***	13,481.3	40.56***	20,972.9	54.24***	13,119.2	53.50***
Geographic Practice Cost Index (GPCI)	-59,427.4	-0.95	-7,476.2	-0.19	-96,395.5	-2.53**	-36,162.3	-1.50
Group Size = 2 FTE Physicians	2,714.6	0.11	2,636.8	0.17	-9,457.0	-0.62	-6,662.1	-0.68
Group Size = 3 to 4 FTE Physicians	-14,701.4	-0.57	-44,685.8	-2.80***	-10,762.8	-0.68	-24,175.2	-2.42**
Group Size = 5 to 10 FTE Physicians	-45,923.1	-1.40	-79,389.5	-3.86***	-26,581.2	-1.33	-39,222.7	-3.11***
Group Size > 10 FTE Physicians	-90,427.0	-1.95*	-118,400.6	-3.93***	-44,229.8	-1.56	-39,183.1	-2.17**
Physician's Age	9,875.8	1.60	4,623.8	1.22	7,368.3	1.94*	3,533.4	1.47
Physician's Age, Squared	-108.3	-1.79*	-48.9	-1.31	-80.5	-2.16**	-36.4	-1.54
Medical Specialties	26,448.6	1.03	-1,595.3	-0.10	23,065.5	1.46	-6,886.7	-0.69
Surgical Specialties	70,382.3	2.69***	22,239.7	1.37	63,813.7	3.98***	19,962.8	1.96**
Other Specialties	-27,675.5	-0.75	-32,313.5	-1.42	-12,095.9	-0.54	-23,752.8	-1.66*
Multi-Specialty Group	-11,460.3	-0.35	40,488.5	1.97**	-22,650.5	-1.17	-293.1	-0.02
Board Certified	-4,642.2	-0.24	-4,521.5	-0.38	16,188.0	1.35	8,882.5	1.16
Practice has any Physician Employees	27,435.6	1.07	92,098.2	5.54***	863.9	0.05	52,415.9	5.23***
Proxy Reported Cost Section	56,576.6	3.42***	37,424.0	3.67***	40,501.8	4.02***	23,841.0	3.73***
Mean of Dependent Variable	$340,391.8		$161,652.7		$327,121.5		$153,508.0	
Degrees of Freedom	1,649		1,696		2,429		2,426	
F-Value	97.4***		90.1***		181.6***		156.4***	
R^2	0.54		0.52		0.60		0.57	

*Significant at .10 or better.
**Significant at .05 or better.
***Significant at .01 or better.

Note: Reference group is General and Family Practitioners in solo practice in New England. Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

physician wage (and aide wage), the higher the total practice expenses per physician. The GPCI input price measure is only significant in the model explaining imputed total costs (Eq. 3). The negative coefficient on GPCI (all four equations) is somewhat surprising; however, it is possible that the GPCI captures differences in efficiency between urban and rural areas. The higher costs of urban areas may generate incentives for more efficient use of inputs, thus conceivably lowering per-physician practice expenses.

The size of the practice was also important. The coefficients on the size dummy variables are significantly negative and greater in magnitude for the largest group size (groups of 10 or more). Size was even more important in the models explaining overhead costs (Eq. 2 and 4). The implication of this finding is that, as practice size increases, the opportunities of sharing expenses also increases (i.e., economies of scale).

Physicians' age was a significant determinant of total practice costs per physician (Eq. 1 and 3). As expected, the squared term is significantly negative, supporting the hypothesis that beyond a certain age, a physician's share of practice expenses increases at a slower rate. Age was not significant in the models explaining overhead costs, however, most likely because physicians' own wages are tied directly to their work effort, whereas their overhead expenses may be less variable in the short run.

Surgical specialty was significant in three of the four models relative to GPs/FPs (except nonimputed overhead costs). Whether a practice is multispecialty is important in the model explaining nonimputed overhead expenses (Eq. 2) but not in any of the others. Not surprisingly, whether a practice had physician employees had a more significant effect in the models explaining overhead costs.

Finally, the coefficient of the proxy indicator was positive and significant in all four of the models. In summary, the coefficients were:

Equation	Dependent Variable	Coefficient	T-value
(1)	Total Per Physician Practice Expenses, Nonimputed	$56,577	3.42
(2)	Total Per-Physician Overhead Expenses, Nonimputed	$37,424	3.67
(3)	Total Per-Physician Practice Expenses, Imputed	$40,502	4.02
(4)	Total Per-Physician Overhead Expenses, Imputed	$23,841	3.73

In every model, the coefficient was statistically significant at the .01 level or better. The interpretation of the coefficient is that, controlling for other important practice and physician characteristics, proxies report total practice expenses between $40,502 and $56,577 higher than nonproxy cases. The difference is also present for overhead expenses, where proxies report between $23,841 and $37,424 higher than nonproxy cases, with other characteristics held constant. Even after dropping physician wages from the models, the coefficients for the proxy variable were consistently positive and significant. These findings are consistent with earlier descriptive results, which showed significant differences between the means for most of the cost components reported by proxy versus nonproxy cases.

Given the significance of the proxy variable, one immediate concern is that practices that are more likely to designate proxies may be systematically different. For example, the results of the logistic regression showed that larger practices were much more likely to designate a proxy. However, the model specified here controls for a multitude of practice characteristics; that is, even after holding constant several practice characteristics, including size, cases using proxies report significantly higher practice costs. Still, the multivariate results are limited to the extent that we have omitted control variables that capture all of the important physician and practice characteristics.

5.0 DISCUSSION

Proxies were designated in close to half of all cases on the 1988 PPCIS. Certain types of physicians were more likely to use a proxy. As would be expected, physicians from larger practices were significantly more likely to designate a proxy, as were those with high opportunity costs. Do proxies have any impact on the data reported in the survey? Two possible impacts were investigated: (1) item nonresponse rates, and (2) magnitude of reported values.

The use of proxies on the 1988 PPCIS most likely helped minimize item nonresponse (and perhaps even unit nonresponse). It is a fair assumption that some of the physicians that designated proxies may have been counted as nonrespondents to the 1988 PPCIS had they not had the opportunity to shorten their own time input into the interview. In addition, the use of proxies may have helped minimize "random guessing" by physicians on practice-level data.

At least with regard to the cost section, proxy cases had similar levels of item nonresponse as cases relying only on physician respondents. What we cannot tell is whether item nonresponse would have been higher in the absence of proxies. For a more rigorous assessment of the role of proxies, a randomized assignment study would be required, whereby some physicians would be allowed to use proxies while others would not.

Another important finding is that proxies reported significantly higher values for most of the cost questions--a finding that is further supported by the multivariate analysis. It is difficult to explain these differences, or to ascertain which group is providing the more accurate information. There are two plausible explanations for proxy cases reporting higher costs. First, proxies may report more accurate and complete data because they are more closely associated with the practice expense information (i.e., paying bills, updating ledgers, and preparing tax documents). Second, it is possible that the proxy indicator is approximating some other practice dimension that is not controlled for in the model, such as the presence of an accounting infrastructure. In other words, practices that have the ability to designate a proxy may also be the practices with relatively higher costs.

The results of this study differ from previous research in two important ways. First, we did not find systematically higher rates of item nonresponse associated with proxy cases (in contrast to Marder and Thran, 1988). Second, we did not find lower levels of practice costs reported by proxies, but rather dramatically higher values. This difference may be due to the model specification used in this study versus Brown's research (1991). In particular, Brown double counted physician employee compensation in the dependent variable, thereby biasing downwards the coefficient on the PROXY variable, among others. In addition, an earlier version of the 1988 PPCIS Public Use Tape, containing a miscoded proxy variable, was used for the analysis.

It would appear that proxies may offer a number of benefits in surveys of physicians. First, given the findings of the multivariate analysis, it is likely that proxies report a higher level of practice expenses, presumably because they are more familiar with, or have access to, practice accounting data. (However, an important caveat to this research is that it is impossible to determine, based on the available information, whether proxy responses are, in fact, more accurate than nonproxy responses.)

Second, proxies may serve to raise item nonresponse rates for some types of questions; in the absence of proxies many expense items probably would not have been reported. However, the non-response analysis presented here is limited because the proxy variable only pertains to the expense questions. Also, this analysis does not control for other practice characteristics which could affect non-response. Ideally, item non-response should be modelled as a function of a vector of characteristics, including whether a proxy was used. Third, we speculate that the use of proxies may convert some refusal cases into respondents, lured by the promise of limited physician involvement.

Thus, for certain types of practices, especially large multispecialty practices, it may be desirable to encourage physicians to designate proxies to report detailed practice cost data (and perhaps other items as well). This study, however, has not considered whether certain types of proxies report more accurate and/or more complete data. That should be the subject of further research.

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APPENDIX A

NONRESPONSE TABLES

TABLE A-1

ITEM NONREPONSE FOR CASES **USING A PROXY:** EXPENSE QUESTIONS[a]

	Number of Cases with PROXY=1	Valid Skips	Total Possible Numeric Responses	Actual Numeric Responses	Percent Nonreponse	PERCENT MISSING DATA				NUMBER OF MISSING DATA			
						.M	.D	.R	Other[b]	.M	.D	.R	Other[b]
Q16	1,403	0	1,403	1,302	7.2%	0.0%	1.0%	6.2%	0.0%	0	14	87	0
Q16A	1,403	0	1,403	1,023	27.1	0.0	2.9	5.4	18.8	0	40	76	264
Q16B	1,403	0	1,403	1,094	22.0	0.1	2.7	5.3	13.9	1	38	75	195
Q17	1,403	2	1,401	1,323	5.6	0.3	0.7	0.8	3.8	4	10	11	53
Q17A	1,403	2	1,401	1,277	8.9	0.4	1.1	0.9	6.6	5	15	12	92
Q17B	1,403	2	1,401	1,280	8.6	0.4	1.4	0.8	6.1	5	20	11	85
Q18	1,403	0	1,403	1,339	4.6	0.1	1.1	2.7	0.6	1	16	38	9
Q18A	1,403	0	1,403	1,138	18.9	0.2	2.4	2.8	13.5	3	33	39	190
Q18B	1,403	0	1,403	1,163	17.1	0.1	2.8	2.9	11.3	1	39	41	159
Q19A	1,403	15	1,388	1,382	0.4	0.0	0.1	0.1	0.1	0	2	2	2
Q19B	1,403	15	1,388	1,333	4.0	0.0	3.3	0.4	0.2	0	46	6	3
Q19D	1,403	0	1,403	1,362	2.9	0.1	1.4	1.2	0.2	2	19	17	3
Q21	1,403	0	1,403	1,236	11.9	0.1	8.5	1.6	1.8	1	119	22	25
Q22	1,403	0	1,403	1,324	5.6	0.0	3.4	1.5	0.7	0	48	21	10
Q23	1,403	0	1,403	1,369	2.4	0.0	1.1	1.2	0.1	0	15	17	2
Q24	1,403	0	1,403	1,310	6.6	0.1	4.6	1.4	0.6	1	64	20	8
Q25	1,403	0	1,403	1,333	5.0	0.0	2.6	1.4	1.0	0	36	20	14
Q26	1,403	0	1,403	1,323	5.7	0.1	3.5	1.6	0.5	1	49	23	7

[a]Proxies were allowed to respond to the expense, malpractice, Medicare, and equipment/lab sections; however, the PROXY variable only indicates whether a proxy responded to the expense section.

[b]Includes combined, uncodeable, and out-of-range codes. The majority are combined.

Note: Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

TABLE A-2

ITEM NONREPONSE FOR CASES **NOT USING A PROXY:** EXPENSE QUESTIONS[a]

	Number of Cases with PROXY=0	Valid Skips	Total Possible Numeric Responses	Actual Numeric Responses	Percent Nonreponse	PERCENT MISSING DATA				NUMBER OF MISSING DATA			
						.M	.D	.R	Other[b]	.M	.D	.R	Other[b]
Q16	1,683	0	1,683	1,579	6.2%	0.1%	0.9%	5.2%	0.0%	1	15	88	0
Q16A	1,683	0	1,683	1,271	24.5	0.0	2.0	4.8	17.7	0	33	81	298
Q16B	1,683	0	1,683	1,277	24.1	0.0	3.6	4.9	15.7	0	60	82	264
Q17	1,683	5	1,678	1,620	3.5	0.2	0.5	1.0	1.7	4	9	17	28
Q17A	1,683	5	1,678	1,598	4.8	0.3	0.8	1.1	2.6	5	14	18	43
Q17B	1,683	0	1,683	1,588	5.6	0.2	1.0	1.1	3.1	4	16	18	52
Q18	1,683	0	1,683	1,595	5.2	0.1	1.4	1.0	1.0	1	24	16	16
Q18A	1,683	0	1,683	1,367	18.8	0.2	2.9	2.6	13.1	3	49	44	220
Q18B	1,683	0	1,683	1,379	18.1	0.2	3.4	2.7	11.6	4	58	46	196
Q19A	1,683	15	1,668	1,648	1.2	0.1	0.7	0.0	0.4	1	12	0	7
Q19B	1,683	15	1,668	1,609	3.5	0.0	2.9	0.2	0.4	0	49	3	7
Q19D	1,683	2	1,681	1,598	4.9	0.4	3.2	0.8	0.7	6	53	13	11
Q21	1,683	0	1,683	1,464	13.0	0.1	10.2	1.0	1.8	1	171	16	31
Q22	1,683	0	1,683	1,550	7.9	0.1	5.1	1.1	1.7	2	85	18	28
Q23	1,683	0	1,683	1,651	1.9	0.0	0.9	0.7	0.3	0	15	12	5
Q24	1,683	0	1,683	1,557	7.5	0.0	5.6	1.1	0.8	0	94	18	14
Q25	1,683	0	1,683	1,606	4.6	0.0	2.7	0.7	1.2	0	45	11	21
Q26	1,683	0	1,683	1,581	6.1	0.0	4.6	1.0	0.5	0	77	16	9

[a]Proxies were allowed to respond to the expense, malpractice, Medicare, and equipment/lab sections; however, the PROXY variable only indicates whether a proxy responded to the expense section.

[b]Includes combined, uncodeable, and out-of-range codes. The majority are combined.

Note: Data excludes physician employees.

Source: 1988 Physicians' Practice Costs and Income Survey.

TABLE A-3

ITEM NONREPONSE FOR CASES **USING A PROXY:** MALPRACTICE AND MEDICARE QUESTIONS[a]

	Number of Cases with PROXY=1	Valid Skips	Total Possible Numeric Responses	Actual Numeric Responses	Percent Nonreponse	PERCENT MISSING DATA				NUMBER OF MISSING DATA			
						.M	.D	.R	Other[b]	.M	.D	.R	Other[b]
Q31	1,403	0	1,403	1,374	2.1%	0.0%	1.6%	0.3%	0.1%	0	23	4	2
Q32	1,403	921	482	281	41.7	1.7	29.5	0.6	10.0	8	142	3	48
Q33	1,403	0	1,403	1,383	1.4	0.4	0.6	0.4	0.0	5	9	5	0
Q33A	1,403	20	1,383	1,374	0.7	0.1	0.6	0.0	0.0	1	8	0	0
Q34	1,403	1,344	59	21	64.4	30.5	25.4	8.5	0.0	18	15	5	0
Q34A	1,403	1,390	13	10	23.1	7.7	15.4	0.0	0.0	1	2	0	0
Q35	1,403	13	1,390	1,343	3.4	0.1	2.9	0.2	0.1	2	41	3	1
Q36	1,403	13	1,390	1,339	3.7	0.1	3.3	0.2	0.0	2	46	3	0
Q37	1,403	0	1,403	1,335	4.8	0.9	3.6	0.4	0.0	12	50	6	0
Q37A	1,403	993	410	321	21.7	2.7	18.8	0.0	0.2	11	77	0	1
Q38A	1,403	0	1,403	1,326	5.5	0.1	5.1	0.2	0.1	1	72	3	1
Q38B	1,403	0	1,403	1,355	3.4	0.1	3.1	0.2	0.1	1	43	3	1
Q38C	1,403	0	1,403	1,341	4.4	0.1	3.8	0.2	0.3	2	53	3	4
Q38D	1,403	0	1,403	1,204	14.2	0.1	4.2	0.2	9.6	2	59	3	135
Q38E	1,403	0	1,403	1,286	8.3	0.1	4.3	0.2	3.7	2	60	3	52
Q38F	1,403	0	1,403	1,331	5.1	0.4	4.3	0.2	0.2	6	60	3	3
Q38G	1,403	72	1,331	1,169	12.2	0.2	11.8	0.2	0.0	2	157	3	0
Q38H	1,403	72	1,331	1,205	9.5	0.1	9.1	0.2	0.1	1	121	3	1
Q39	1,403	72	1,331	1,324	0.5	0.2	0.3	0.1	0.0	2	4	1	0
Q40	1,403	72	1,331	1,324	0.5	0.2	0.4	0.0	0.0	2	5	0	0
Q40B	1,403	731	672	641	4.6	0.4	4.0	0.1	0.0	3	27	1	0
Q40C	1,403	772	631	571	9.5	0.8	8.6	0.2	0.0	5	54	1	0
Q41A	1,403	142	1,261	1,226	2.8	0.4	2.3	0.1	0.0	5	29	1	0
Q41B	1,403	142	1,261	1,223	3.0	0.6	2.4	0.1	0.0	7	30	1	0
Q41C	1,403	288	1,115	1,078	3.3	0.4	2.8	0.1	0.0	5	31	1	0
Q41D	1,403	288	1,115	1,075	3.6	0.4	3.0	0.1	0.0	5	34	1	0
Q42	1,403	135	1,268	1,172	7.6	1.7	5.6	0.2	0.1	22	71	2	1

[a]Proxies were allowed to respond to the expense, revenue, malpractice, Medicare, and equipment/lab sections; however, the PROXY variable only indicates whether a proxy responded to the expense section.

[b]Includes combined, uncodeable, and out-of-range codes. The majority are combined.

Source: 1988 Physicians' Practice Costs and Income Survey.

TABLE A-4

ITEM NONREPONSE FOR CASES **NOT USING A PROXY:** MALPRACTICE AND MEDICARE QUESTIONS[a]

	Number of Cases with PROXY=0	Valid Skips	Total Possible Numeric Responses	Actual Numeric Responses	Percent Nonreponse	PERCENT MISSING DATA				NUMBER OF MISSING DATA			
						.M	.D	.R	Other[b]	.M	.D	.R	Other[b]
Q31	1,683	0	1,683	1,662	1.2%	0.0%	0.7%	0.5%	0.1%	0	12	8	1
Q32	1,683	1,175	508	348	31.5	2.0	21.1	0.8	7.7	10	107	4	39
Q33	1,683	10	1,673	1,654	1.1	0.5	0.2	0.4	0.0	9	4	6	0
Q33A	1,683	29	1,654	1,611	2.6	0.1	2.5	0.0	0.1	1	41	0	1
Q34	1,683	1,638	45	20	55.6	26.7	13.3	15.6	0.0	12	6	7	0
Q34A	1,683	1,667	16	15	6.3	0.0	6.3	0.0	0.0	0	1	0	0
Q35	1,683	16	1,667	1,623	2.6	0.1	2.3	0.2	0.0	2	38	4	0
Q36	1,683	16	1,667	1,619	2.9	0.1	2.5	0.3	0.0	2	41	5	0
Q37	1,683	10	1,673	1,622	3.0	0.7	2.0	0.3	0.0	12	34	5	0
Q37A	1,683	1,266	417	356	14.6	1.4	12.5	0.7	0.0	6	52	3	0
Q38A	1,683	10	1,673	1,582	5.4	0.1	4.8	0.4	0.1	1	81	7	2
Q38B	1,683	0	1,683	1,616	4.0	0.1	3.4	0.4	0.1	1	58	6	2
Q38C	1,683	10	1,673	1,593	4.8	0.1	4.0	0.4	0.3	1	67	7	5
Q38D	1,683	10	1,673	1,400	16.3	0.1	5.0	0.4	10.8	1	84	7	181
Q38E	1,683	10	1,673	1,494	10.7	0.1	4.8	0.4	5.4	1	80	7	91
Q38F	1,683	10	1,673	1,577	5.7	0.4	4.6	0.4	0.3	7	77	7	5
Q38G	1,683	152	1,531	1,331	13.1	0.3	12.6	0.2	0.0	4	193	3	0
Q38H	1,683	152	1,531	1,376	10.1	0.3	9.5	0.2	0.1	5	146	3	1
Q39	1,683	144	1,539	1,528	0.7	0.1	0.5	0.1	0.0	2	7	2	0
Q40	1,683	152	1,531	1,518	0.8	0.1	0.6	0.1	0.0	2	9	2	0
Q40B	1,683	899	784	742	5.4	0.4	4.5	0.5	0.0	3	35	4	0
Q40C	1,683	968	715	639	10.6	1.7	8.4	0.6	0.0	12	60	4	0
Q41A	1,683	255	1,428	1,350	5.5	0.6	4.4	0.2	0.2	9	63	3	3
Q41B	1,683	255	1,428	1,346	5.7	0.7	4.7	0.2	0.1	10	67	3	2
Q41C	1,683	393	1,290	1,219	5.5	0.6	4.6	0.2	0.1	8	59	3	1
Q41D	1,683	393	1,290	1,203	6.7	1.2	5.2	0.2	0.2	15	67	3	2
Q42	1,683	239	1,444	1,289	10.7	2.7	7.8	0.2	0.0	39	113	3	0

[a]Proxies were allowed to respond to the expense, revenue, malpractice, Medicare, and equipment/lab sections; however, the PROXY variable only indicates whether a proxy responded to the expense section.

[b]Includes combined, uncodeable, and out-of-range codes. The majority are combined.

Source: 1988 Physicians' Practice Costs and Income Survey.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Health Care Financing Administration

6325 Security Boulevard
Baltimore, MD 21207

September 4, 1992

John E. Schneider, M.A.
Center for Health Economics Research
300 Fifth Avenue, 6th Floor
Waltham, Massachusetts 02154

Dear John,

Thank you for the final report entitled, "Analysis of Proxy Effects in the 1988 Physicians' Practice Cost and Income Survey." I find that you have been very responsive to the comments which I sent you less than two weeks ago and therefore accept this report. I am also very appreciative of the speed with which you turned around the draft final report.

As you know, today is my last day with HCFA. It has been a pleasure working with you John, even on the 1988 PPCIS. I have always found you to be very responsive; a Project Officer's dream. I hope that our paths will cross in the future, but not in Chicago.

Regards,

Nancy

Nancy Taplin McCall

cc: Mike Baier, HCFA